Auto-Tune® Live

Ultra Low Latency Pitch Correction and Auto-Tune Vocal Effect

Owner's Manual

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Whew! Now that that's over, let's get on to the good stuff.

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Welcome!

On behalf of everyone at Antares Audio Technologies, we'd like to offer both our thanks and congratulations on your decision to purchase Auto-Tune Live, an ultra low latency version of the worldwide standard in professional pitch correction and manipulation optimized for real time operation and control.

Before you proceed any farther, we'd like to strongly encourage you to register and authorize your copy of Auto-Tune Live. (You can skip ahead to the Authorization and Installation instructions on pages 6 and 7. We'll wait.) Also, if you're planning on discarding that lovely Auto-Tune Live box, it's probably a good idea to write down the serial number that appears on the bottom of the box for future reference.

At Antares, we are committed to excellence in quality, customer service, and technological innovation. With your purchase of Auto-Tune Live, you have created a relationship with Antares which we hope will be long and gratifying. Let us know what you think. You can count on us to listen.

Again, thanks.

The Whole Antares Crew

Chapter 1: Getting Started

If you are new to Auto-Tune, we encourage you to read this manual and work through the tutorials in Chapter 4. It's the quickest way to become familiar with what Auto-Tune Live does and how it does it.

If you've used or are currently using a fairly recent version of Auto-Tune's real time Automatic Mode, you will find that what you're already doing will continue to work in Auto-Tune Live, only with minimal latency and with MIDI control of all the key parameters.

The contents of this manual

Chapter 1: Getting Started
The chapter you are reading.

Chapter 2: Introducing Auto-Tune Live
This chapter presents some basic facts about pitch and how Auto-Tune Live functions to correct pitch errors. The basic functionality of Auto-Tune Live is discussed, and information you need in order to use it effectively is provided.

Chapter 3: Auto-Tune Live Controls
This chapter is reference information for all of the controls used in the Auto-Tune Live interface.

Chapter 4: Auto-Tune Live Tutorials
This chapter introduces you to details of how Auto-Tune Live works by guiding you through several tutorials. The tutorials will give you insight into how and when to use each of Auto-Tune Live's key functions.

Chapter 5: The Auto-Tune Vocal Effect
What it is. How to do it.

Chapter 6: The Auto-Tune Live Scales
Brief descriptions of the various scales available in Auto-Tune Live.

Installing Auto-Tune Live

Auto-Tune Live is designed to work with a wide variety of digital audio applications. Please refer to your host application's user manual for more information on installing and using plug-ins. (Although in most cases, simply double-clicking the Auto-Tune Live installer and following the resulting directions will be all you need to do.)

Authorizing Auto-Tune Live

Authorization is the process by which Auto-Tune Live is allowed to permanently run on your computer. Detailed instructions covering the available authorization options will be found in the file "Authorization Read Me" which is included on the installation DVD ROM or with your software download.

> **NOTE:** *You will need to authorize Auto-Tune Live before you can run it in your host. If you plan to follow along with the manual (a good idea), go do it now.*

Technical Support

In the unlikely event that you experience a problem using Auto-Tune Live, try the following:

1. Make sure you have the latest version of the plug-in. You can download and install the latest version of Auto-Tune Live from the following web page:

   http://www.antarestech.com/download/update.shtml

2. If you are having problems authorizing your software, be sure that you have the latest version of the PACE Interlok drivers. You can download and install the latest version for your operating system by going to ilok.com and clicking the "Download" tab.

If your problem is not resolved after taking the above actions, try the following:

1. Make another quick scan through this manual. Who knows? You may have stumbled onto some feature that you didn't notice the first time through.

2. Consult our searchable knowledgebase at:

   http://www.antarestech.com/support/index.html

3. Check our web site for tips, techniques, or any late-breaking information:

   http://www.antarestech.com

4. Join the Antares Online Community. The Antares Online Community is a place where Antares product users can gather to exchange information, compare notes, and get to know other Antares users from around the world. Check it out at:

   http://www.antarestech.net

5. For the quickest access to new developments, follow us on Twitter and "Like" our Facebook pages:

   http://twitter.com/AntaresAudio

   http://www.facebook.com/pages/Antares-Audio-Technologies/6852445Live680

   http://www.facebook.com/pages/Auto-Tune/81891651280

Chapter 2: Introducing Auto-Tune Live

Some background

In 1997, Antares Audio Technologies first introduced the ground-breaking Auto-Tune Pitch Correcting Plug-In. Auto-Tune was a tool that actually corrected the pitch of vocals and other solo instruments, in real time, without distortion or artifacts, while preserving all of the expressive nuance of the original performance. Recording Magazine called Auto-Tune the "holy grail of recording." And went on to say, "Bottom line, Auto-Tune is amazing... Everyone with a Mac should have this program." (In fact, we know of quite a few people back then who bought kilo-buck Pro Tools™ systems just to be able to run Auto-Tune.)

In the intervening years, Auto-Tune has established itself as the worldwide standard in professional pitch correction. Today, it's used daily by tens of thousands of audio professionals around the world to save studio and editing time, ease the frustration of endless retakes, save that otherwise once-in-a-lifetime performance, or to create what has become the signature vocal effect of our time.

Now, with Auto-Tune Live, we've created a version of Auto-Tune optimized for real-time use in performance or when tracking in the studio.

So what exactly is Auto-Tune Live?

Auto-Tune Live is a real-time tool for correcting intonation and timing errors or creatively modifying the intonation of a performance. Auto-Tune Live provides world professional standard Auto-Tune pitch correction optimized for tracking and live performance with ultra-low latency and comprehensive MIDI control.

Thanks to its ultra-low latency, Auto-Tune Live allows virtually instant response in performance or when tracking in the studio. And with its MIDI control capabilities, you can control all of Auto-Tune Live's key performance parameters in real time, for the ultimate in creative pitch processing.

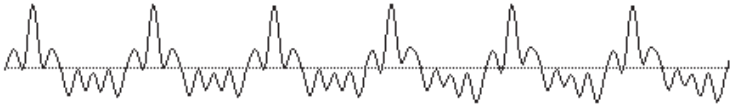
Auto-Tune Live employs state-of-the-art digital signal processing algorithms (many, interestingly enough, drawn from the geophysical industry) to continuously detect the pitch of a periodic input signal (typically a solo voice or instrument) and instantly and seamlessly change it to a desired pitch (defined by any of a number of user-programmable scales or by MIDI input).

To take maximum advantage of the power of Auto-Tune Live's pitch correction functions, you should have a basic understanding of pitch and how Auto-Tune Live functions to correct pitch errors. This chapter presents basic terminology and introduces Auto-Tune Live's operating paradigm, giving you the background you need to use it effectively.

A little bit about pitch

Pitch is traditionally associated with our perception of the "highness" or "lowness" of a particular sound. Our perception of pitch ranges from the very general (the high pitch of hissing steam, the low pitch of the rumble of Godzilla's enormous footsteps as he stomps his way through Tokyo) to the very specific (the exact pitch of a solo singer or violinist). There is, of course, a wide range of variation in the middle. A symphony orchestra playing a scale in unison, for example, results in an extremely complex waveform, yet you are still able to easily sense the pitch.

The vocalists and the solo instruments that Auto-Tune Live is designed to process have a very clearly defined quality of pitch. The sound generating mechanism of these sources is a vibrating element (vocal chords, a string, an air column, etc.). The sound that is thus generated can be graphically represented as a waveform (a graph of the sound's pressure over time) that is periodic. This means that each cycle of waveform repeats itself fairly exactly, as in the periodic waveform shown in the diagram below:



Because of its periodic nature, this sound's pitch can be easily identified and processed by Auto-Tune Live.

Other sounds are more complex. This waveform:

is of a violin section playing a single note in unison. Our ears still sense a specific pitch, but the waveform does not repeat itself. This waveform is a summation of a number of individually periodic violins. The summation is non-periodic because the individual violins are slightly out of tune with respect to one another. Because of this lack of periodicity, Auto-Tune Live would not be able to process this sound.

Some pitch terminology

The pitch of a periodic waveform is defined as the number of times the periodic element repeats in one second. This is measured in Hertz (abbreviated Hz.). For example, the pitch of A4 (the A above middle C on a piano) is traditionally 440Hz (although that standard varies by a few Hz. in various parts of the world).

Pitches are often described relative to one another as intervals, or ratios of frequency. For example, two pitches are said to be one octave apart if their frequencies differ by a factor of two. Pitch ratios are measured in units called cents. There are 1200 cents per octave. For example, two tones that are 2400 cents apart are two octaves apart. The traditional twelve-tone Equal Tempered Scale that is used (or rather approximated) in 99.9% of all Western tonal music consists of tones that are, by definition, 100 cents apart. This interval of 100 cents is called a semitone.

The twelve equally-spaced tones of the Equal Tempered Scale happen to contain a number of intervals that approximate integer ratios in pitch. The following table shows these approximations:

INTERVAL	CENTS	NEARBY RATIO	RATIO IN CENTS
minor second	100	16/15	111.75
major second	200	9/8	203.91
minor third	300	6/5	315.64
major third	400	5/3	86.31
perfect fourth	500	4/3	498.04
tritone	600		
perfect fifth	700	3/2	701.65
minor sixth	800	8/	813.69
major sixth	900	5/3	884.36
minor seventh	1000	16/9	996.09
major seventh	1100	15/8	1088.27
octave	1200	2	1200.00

As you can see, the intervals in the Equal Tempered Scale are NOT equal to the harmonious integer ratios. Rather, the Equal Tempered Scale is a compromise. It became widely used because once a harpsichord or piano is tuned to that scale, any composition in any key could be played and no one chord would sound better or worse than that same chord in another key.

How Auto-Tune Live detects pitch

In order for Auto-Tune Live to automatically correct pitch, it must first detect the pitch of the input sound. Calculating the pitch of a periodic waveform is a straightforward process. Simply measure the time between repetitions of the waveform. Divide this time into one, and you have the frequency in Hertz. Auto-Tune Live does exactly this: It looks for a periodically repeating waveform and calculates the time interval between repetitions.

The pitch detection algorithm in Auto-Tune Live is virtually instantaneous. It can recognize the repetition in a periodic sound within a few cycles. This usually occurs before the sound has sufficient amplitude to be heard. Used in combination with an extremely slight processing delay, the output pitch can be detected and corrected without artifacts in a seamless and continuous fashion.

Auto-Tune Live was designed to detect and correct pitches up to the pitch C6. (If the input pitch is higher than C6, Auto-Tune Live will occasionally interpret the pitch an octave lower. This is because it interprets a two cycle repetition as a one cycle repetition.) On the low end, Auto-Tune Live will detect pitches as low as 25Hz (when the Bass Input Type is selected). This range of pitches allows intonation correction to be performed on virtually all vocals and instruments.

Of course, Auto-Tune Live will not detect pitch when the input waveform is not periodic. As demonstrated above, Auto-Tune Live will fail to tune up even a unison violin section. But this can also occasionally be a problem with solo voice and solo instruments as well. Consider, for example, an exceptionally breathy voice, or a voice recorded in an unavoidably noisy environment. The added signal is non-periodic, and Auto-Tune Live will have difficulty determining the pitch of the composite (voice + noise) sound. Luckily, there is a control (the Tracking control, discussed in Chapter 3) that will let Auto-Tune Live be a bit more casual about what it considers "periodic." Experimenting with this setting will often allow Auto-Tune Live to track even noisy signals.

> **A NOTE:** *The above description has been in pretty much every Auto-Tune manual since the beginning. While it is still definitely true in the general case, it must be noted that Auto-Tune Evo did a much better job than any prior version of Auto-Tune with borderline troublesome material and Auto-Tune Live (as well as Auto-Tune 7) does even better yet.*

How Auto-Tune Live corrects pitch

Auto-Tune Live works by continuously tracking the pitch of an input sound and comparing it to a user-defined scale. The scale tone closest to the input is continuously identified. If the input pitch exactly matches the scale tone, no correction is applied. If the input pitch varies from the desired scale tone, an output pitch is generated which is closer to the scale tone than the input pitch. (The exact amount of correction is controlled by the Retune Speed and Humanize settings, described below and in Chapter 3.)

Scales

The heart of Auto-Tune Live pitch correction is the Scale. Auto-Tune Live lets you choose from major, minor, chromatic or 26 historical, ethnic and micro-tonal scales. Individual scale notes can be bypassed, resulting in no pitch correction when the input is near those notes. Individual scale notes can also be removed, allowing a wider range of pitch correction for neighboring pitches. The scale can be detuned, allowing pitch correction to any pitch center.

For added flexibility, you can also select the target pitches in real time via MIDI from a MIDI keyboard or a pre-recorded sequencer track.

Retune Speed

Auto-Tune Live also gives you control over how rapidly, in time, the pitch adjustment is made toward the scale tone. This is set with the Retune Speed control (see Chapter 3 for more details).

Fast Speed settings are appropriate for short duration notes and for mechanical instruments, like oboe or clarinet, whose pitch typically changes almost instantly. A fast enough setting will also minimize or completely remove a vibrato, as well as produce the iconic Auto-Tune Vocal Effect.

Slow Speed settings, on the other hand, are appropriate for longer notes where you want expressive pitch gestures (like vibrato) to come through at the output and for vocal and instrumental styles that are typified by gradual slides (portamento) between pitches. An appropriately selected slow setting can leave expressive gestures intact while moving the average pitch to the correct tonal center.

Vibrato

Auto-Tune Live allows real-time adjustment of the depth of any natural vibrato present in the input.

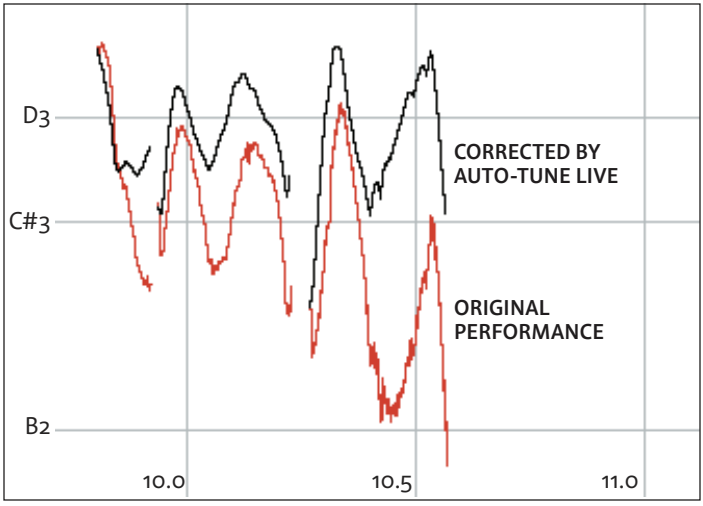
Auto-Tune Live can also add a vibrato to an input that does not naturally exhibit one. You can program the vibrato rate along with individual vibrato

depths for pitch, amplitude (loudness) and formant (resonant frequencies). You can also specify delayed vibrato with independently programmable onset delay and onset rate.

By combining a fast Retune Speed setting with Auto-Tune Live's Vibrato settings, you can even remove a performer's own vibrato and replace it with Auto-Tune Live's programmed vibrato, all in real time. Also, unusual combinations of Vibrato Waveform, Rate and Depth settings can be used for some interesting special effects.

An example of Auto-Tune Live pitch correction

As an example, consider this before-and-after graphic representation of the pitch of a vocal phrase that contains both vibrato and expressive gestures.



In the original performance, we can see that although the final note should be centered around D, the vocalist allowed the tail of the note to fall nearly three semitones flat. The "after" plot is the result of passing this phrase through Auto-Tune Live programmed to a D Major Scale (with C# and B set to "Remove") and a Retune Speed setting of 25. That Retune Speed causes the pitch center to be moved to D, while still retaining the vibrato and expressive gestures. (Setting C# and B to "Remove" is necessary to keep Auto-Tune Live from trying to correct the seriously flat tail of the last note to those pitches. See Chapter 3 for more details.)

Formant Correction and Throat Modeling

Formant Correction

A sound's "formants" are the combined acoustic resonances that result from the physical structure of whatever is producing the sound.

In the case of a human voice, air from your lungs is forced through your vocal chords, causing them to vibrate. From there, the voice is propagated through the throat, the mouth and out through the lips. It is the shape of these structures that create the resonant characteristics that define your unique vocal identity.

When a vocal is pitch-shifted by large intervals without formant correction, not only is the pitch of sung notes shifted, but the formants are shifted as well. The resulting effect is not just of a person singing higher or lower notes, but of a person who is literally growing or shrinking (depending on the direction of the shift). While this can be useful for producing singing chipmunks, it typically does not produce realistic vocals when shifted more than a semitone or two.

Engaging Auto-Tune Live's Formant Correction prevents the shifting of a voice's resonant frequencies to ensure that its vocal characteristics are preserved over the pitch shift range.

AN IMPORTANT NOTE: *Over the very small intervals usually associated with basic pitch correction, formant shifting is essentially inaudible and Auto-Tune's classic pitch adjustment technology still provides the optimum results. Formant Correction is designed to be used on tracks where notes are shifted by larger intervals.*

Throat Modeling

As mentioned above, the shape of a singer's throat is a prime contributor to their vocal character. Auto-Tune Live's Throat Length control lets you use Antares' unique throat modeling technology to modify a voice's character by passing it through a precise physical model of the human vocal tract.

Latency

Due to the nature of how Auto-Tune works, along with differences in the various hosts, who all add their own bit of latency during tracking, it's impossible to state an absolute Auto-Tune Live latency specification. However, in our tests of Auto-Tune Live in major hosts, latency was consistently undetectable when tracking live with vocals.

For the technically curious, the maximum inherent latency of Auto-Tune Live itself, distinct from any contribution by the host, is variable with the frequency of the audio being detected and range of the correction. As an example, when correcting to a target pitch of A 440Hz, Auto-Tune Live's latency can vary from a only a few samples to a maximum of around 100 samples (less than 2.3ms). Again, this is separate from the inherent latency of your host.

For all practical purposes, Auto-Tune Live's response is instantaneous. However, if you're the sort who wants to know that you're getting the absolute minimum total latency from Auto-Tune Live and your host, you can reduce your host's hardware buffer size to the smallest size that still results in acceptable audio performance.

Chapter 3: Auto-Tune Live Controls

This chapter is a reference for all of the controls used in the Auto-Tune Live interface. How these controls are used together for pitch correction is demonstrated in Chapter 4, Auto-Tune Live Tutorials.

Continuous Controls

Auto-Tune Live's continuous controls are represented graphically as virtual knobs. Depending on your preference, you can control knobs by linear or radial mouse movement. Set your preference in the Options dialog described below.

Double-clicking on a knob will return it to its default value. In some host applications, Command (Mac)/Control (PC) clicking on a knob will also reset it to default (see your host application manual for details).

Input Type

As a result of Antares' research into the unique characteristics of various types of audio signals, Auto-Tune Live offers a selection of optimized processing algorithms for the most commonly pitch-corrected inputs. Choices include Soprano Voice, Alto/Tenor Voice, Low Male Voice, Instrument, and Bass Instrument. Matching the appropriate algorithm to the input results in even faster and more accurate pitch detection and correction.

To select the desired Input Type, click on the Input Type pop-up and then select the desired type from the pop-up list.

> **NOTE:** *Choosing the wrong Input Type (or just forgetting to set it at all) can result in compromised performance. Pay attention.*

> **ANOTHER NOTE:** *When any Input Type other than Bass Instrument is selected, Auto-Tune Live is reliably able to detect pitches down to A1 (55Hz). Selecting Bass Instrument lowers the lowest detectable frequency by about one octave to 25Hz. Since the lowest E string on a bass guitar is approximately 41Hz, Bass Instrument (as its name so ably implies) allows you to apply pitch correction to those pesky fretless bass lines as well as other low bass range instruments. However, when Bass Instrument is selected, pitches above A4 may be incorrectly tuned, so be sure to select Bass Instrument only when correcting bass range tracks.*

Tracking

In order to accurately identify the pitch of the input, Auto-Tune Live requires a periodically repeating waveform, characteristic of a voice or solo instrument. The Tracking control determines how much variation is allowed in the incoming waveform for Auto-Tune Live to still consider it periodic.

If you are working with a well-isolated solo signal (e.g., tracking in a studio or off of a multitrack master) you can typically set the Tracking control to 50 and forget it.

If, on the other hand, your signal is noisy or not well-isolated (as might be more common in a live performance situation) or you are dealing with a particularly breathy or guttural voice, it may be necessary to allow more signal variation (higher Tracking numbers). However, under these circumstances tracking is not guaranteed and a too "relaxed" setting may introduce distortion and popping.

Select Pitch Reference

Auto-Tune Live provides the ability to pitch correct stereo tracks while maintaining the tracks' phase coherence. (Refer to your host application's manual for instructions on assigning a plug-in to a stereo track.) Click the appropriate button to select which of the two stereo tracks (left or right) Auto-Tune Live will use as a pitch reference.

> **NOTE:** *If there is a marked difference in the two tracks, pick the cleanest, most isolated track. For example, if one track is a close mic'd vocal while the other is mic'd from farther away for ambience, or is heavily processed, select the close mic'd track.*

> **ANOTHER NOTE:** *Auto-Tune Live will only pitch correct true stereo tracks. If the second track (i.e., the track not selected as a pitch reference) is simply an independent unrelated track, unpredictable (and potentially unpleasant) sounds may result. On the other hand, something interesting might happen. You never know.*

When Auto-Tune Live is instantiated on a mono track, this control is inactive (grayed out).

Key Selection

This control lets you select the key of the track you plan to process.

To select the desired key, click on the Key pop-up and then select the desired note from the pop-up list. This determines the pitch of the first note of the scale according to the standard A3 = 440 Hertz.

Scale Selection

This control is used in combination with the Key selection above to define the scale of the track you plan to process.

To select a scale, click on the Scale popup and then select the desired scale from the pop-up list.

> **NOTE:** *To avoid having to deal with scales containing those annoying double flats, double sharps and notes like Cb, E#, Fb and B#, Auto-Tune Live will automatically choose the simpler of two enharmonically equivalent scales. For example, if you select Db Major, the Edit Scale Display will duly display the Db Major scale. However, if you then go to the Scale selection pop-up and select Minor, the Key will automatically be changed to C# and the Edit Scale Display will, in fact, display the much friendlier C# Minor scale.*

Auto-Tune Live comes with 29 preprogrammed scales. The first three equal-tempered scales, chromatic, major, and minor, are the ubiquitous scales typically found in Western tonal music. The other scales are historical, ethnic, and micro-tonal scales. An in-depth discussion of these scales and their history is beyond the scope of this manual. The interested reader will find more information in *Tuning In — Micro-tonality In Electronic Music* by Scott R. Wilkinson, published by Hal Leonard Books.

A brief description of each scale can be found in Chapter 6, The Auto-Tune Live Scales

Scale Detune

The Detune parameter allows you to change the pitch standard of Auto-Tune Live from the default A = 440Hz. The value is set in cents (100 cents = 1 semitone). The range of adjustment is from -100 to +100 cents. For convenience, the detune amount is also displayed in Hertz relative to A440.

The Detune function can be used to tune a vocal performance to some irreparably out-of-tune instrument (a piano or organ, for example), or to allow correction to other than the conventional 440Hz standard.

A Tip: If you have a tone that you want to use as the pitch standard, select that tone and play it in a loop. Adjust Scale Detune until the Change meter reads zero. (You may be required to use the Edit Scale Display to remove adjacent notes so that Auto-Tune Live doesn't tune to the wrong note.)

The default Scale Detune setting is 0 cents. Double-clicking or Command (Mac)/Control (PC) clicking the Scale Detune knob will reset it to that value.

Throat Length

As mentioned back in Chapter 2, the shape of a singer's throat is a prime contributor to their vocal character. Auto-Tune Live lets you modify the vocal quality of a performance by actually varying the geometry of a physical model of the human vocal tract and processing the your performance through that model in real time.

The Throat Length control lets you modify the length of the modeled throat. The range of the control is 50 to 180. Values above 100 represent a lengthening of the throat while values below 100 represent a shortening of the throat.

The actual values represent the percentage change in the throat length. For example, a value of 120 represents a 20% increase in throat length, while a value of 70 represents a 30% decrease in throat length.

NOTE: *This control is only active when Formant Correction is engaged. When Formant Correction is not engaged, this control is disabled (grayed out).*

NOTE: *While this control gives you the ability to radically change the throat length, keep in mind that the variation in the length of human vocal tracts is rarely more than about 20% in either direction. If you are looking for a "realistic" vocal characteristic, start with modest settings of this control. More extreme settings can produce dramatic results, but probably not what anyone would call "realistic."*

Command (Mac)/Control (PC) click the control to reset it to its default value of 100.

IMPORTANT NOTE: *This function is specifically for changing the existing quality of a voice, not for manual formant compensation for pitch shifting. Auto-Tune Live automatically applies appropriate formant correction when it shifts pitch with Formant Correction Enabled.*

Formant Correction

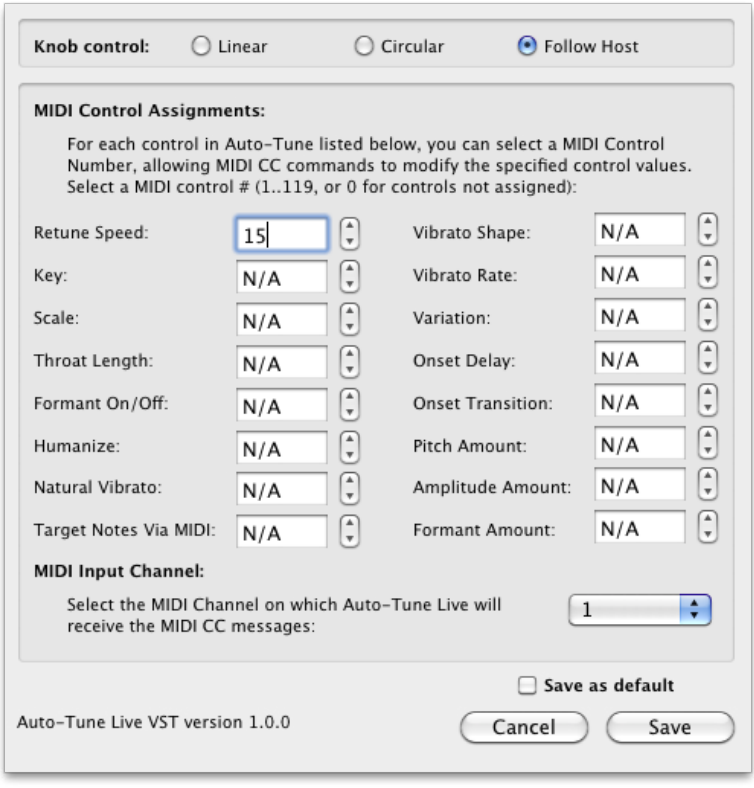
Click the Formant button to toggle Auto-Tune Live's formant correction function on and off. The button will turn blue when formant correction is active and will be pale gray when it is inactive.

Engaging Auto-Tune Live's Formant Correction prevents the shifting of a voice's resonant frequencies to ensure that its vocal characteristics are preserved over the pitch shift range. (For a more complete explanation of formant correction, refer to the Pitch Shifting and Formant Correction section in Chapter 2.)

AN IMPORTANT NOTE: *Over the very small intervals usually associated with basic pitch correction, formant shifting is essentially inaudible and Auto-Tune's classic pitch adjustment technology still provides the optimum results. Formant Correction is designed to be used with overall transposition or on tracks where notes are shifted by large intervals.*

Options

Clicking the Options button will bring up a window containing a number of settings that fall into the "set and forget" category. They are:


Knob control:
Linear
Circular
Follow Host
MIDI Control Assignments:
For each control in Auto-Tune listed below, you can select a MIDI Control Number, allowing MIDI CC commands to modify the specified control values. Select a MIDI control # (1..119, or 0 for controls not assigned):
Retune Speed: 15
Key: N/A
Scale: N/A
Throat Length: N/A
Formant On/Off: N/A
Humanize: N/A
Natural Vibrato: N/A
Target Notes Via MIDI: N/A
Vibrato Shape: N/A
Vibrato Rate: N/A
Variation: N/A
Onset Delay: N/A
Onset Transition: N/A
Pitch Amount: N/A
Amplitude Amount: N/A
Formant Amount: N/A
MIDI Input Channel:
Select the MIDI Channel on which Auto-Tune Live will receive the MIDI CC messages:
1
Save as default
Auto-Tune Live VST version 1.0.0
Cancel
Save

Knob Control

Lets you select how you want to control the virtual "knobs" in the Auto-Tune Live interface.

- **Linear** Position the cursor over a knob, press and hold the left mouse button (or the only mouse button, if you're using a one-button mouse) and move the cursor up or to the right to turn the knob clockwise or down or to the left to turn the knob counterclockwise. The current value of the knob's parameter appears in its associated numeric display.
- **Circular** Click anywhere around the circumference of the knob, press and hold the left mouse button and "rotate" the knob in the desired direction. The current value of the knob's parameter appears in its associated numeric display.
- **Follow Host** Some hosts also allow you to select a knob control method and pass that selection on to plug-ins. If yours does, selecting Follow Host will automatically set Auto-Tune Live's Knob Control to the method selected in your host. If you select Follow Host, but your host doesn't supply that information to Auto-Tune Live, knob control will default to Linear.

MIDI Control Assignments

These controls let you assign MIDI controllers to various Auto-Tune Live controls for real-time MIDI control of key Auto-Tune Live performance parameters from a MIDI controller keyboard or other MIDI control surface. (Refer to your host application's manual for details on how to route MIDI to Auto-Tune Live.)

For each available control, you can select a MIDI controller in the range of Controller 0 to Controller 119. Alternatively, you can select "N/A" (Not Assigned) to exempt a particular control from any MIDI control.

Additionally, you can type Controller numbers directly into the data fields. Entering "0" is the same as selecting N/A. If you attempt to enter a number that is not in the range 0–119, you will not be able to proceed until you select or enter a number in that range.

> **NOTE:** *If you assign the same MIDI controller to multiple Auto-Tune Live controls, only one of them will actually respond to that controller (which one responds depends on the particular mix of controls selected). So in general, don't do that.*

MIDI Input Channel

This control lets you select the MIDI channel to which Auto-Tune Live responds. The choices are channels 1–16 or Omni (i.e., Auto-Tune Live will respond to messages on any MIDI channel). Additionally, you can select OFF, which turns off MIDI control, regardless of whether any controls are mapped in the section above.

> **NOTE:** *Although these days virtually all major hosts allow the routing of MIDI to plug-ins, there may still be a few hosts lurking out there that do not support it. If you happen to be using one of those, the above MIDI functions will not be selectable.*

Save as default

When the "Save as default" box is checked, any changes you make to the various Options settings are saved as defaults for all future instances of Auto-Tune Live.

If you want to make a temporary change to an Option setting for a particular track, but want to retain the previous default for future instances, uncheck the "Save as default" box before clicking the Save button. Your modified value will take effect in the current instance of Auto-Tune Live, but future instances will revert to the previously saved value.

Bypass

Auto-Tune Live does not include a dedicated Bypass control as that function is typically provided by the host application's plug-in interface.

Pitch Correction Functions

Retune Speed

Retune Speed controls how rapidly the pitch correction is applied to the incoming sound. The units are milliseconds. A value of zero will cause instantaneous changes from one tone to another and will completely suppress a vibrato (note that any related volume changes will remain). Values from 10 to 50 are typical for vocals (unless you're going for the iconic Auto-Tune Vocal Effect effect, in which case use 0). Larger values let through more vibrato and other interpretative pitch gestures but also slow down how rapidly pitch corrections are made.

Although the above suggestions can be used as starting points, finding the correct Retune Speed setting for a particular performance is largely a matter of trial-and-error and depends on such attributes as song tempo, note duration and vocal style, among others. As always, let your ears be your guide.

The default Retune Speed value is 20. Double-clicking or Command (Mac)/ Control (PC) clicking the Retune Speed knob will reset it to that value.

Humanize

One situation that can be problematic is a performance that includes both very short notes and longer sustained notes. The problem is that in order to get the short notes in tune, you'd have to set a fast Retune Speed, which would then make any sustained notes sound unnaturally static. Luckily, the Humanize function easily solves this problem.

The Humanize function differentiates between short and sustained notes and lets you apply a slower Retune Speed just to the sustained notes. Thus, the short notes are in tune and the sustained notes still allow the natural variations of the original performance.

Here's how it works:
Start by setting Humanize to 0 and adjusting the Retune Speed until the shortest problem notes in the performance are in tune. At this point, any sustained notes may sound unnaturally static. If so, start advancing the Humanize control. The higher the Humanize setting, the more the Retune Speed is slowed for sustained notes. The goal is to find the point where the sustained notes are also in tune and just enough of the natural variation in the performance is present in the sustained notes to sound natural and realistic. (If you set Humanize too high, any problem sustained notes may not be fully corrected.)

This is another of those settings where you have to let your ears be your guide. The optimum Humanize setting for any particular performance will depend on the performance style, the other parameter settings and the specific effect you desire.

The default Humanize setting is 0. Double-clicking or Command (Mac)/ Control (PC) clicking the Humanize knob will reset it to that value.

Natural Vibrato

The Natural Vibrato function allows real-time modification (either increase or decrease) of the depth of any vibrato present in the input audio while preserving the original shape and character of the vibrato.

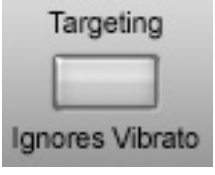
This function uses the same Stochastic Optimal Linear Estimation Theory as the Targeting Ignores Vibrato function (described below) to differentiate between vibrato and intended pitch changes, adjusting the vibrato depth while leaving intended pitch changes intact.

The Natural Vibrato function acts independently of the pitch correction functions. Of particular note is the fact that setting a scale note or notes to Bypass still allows vibrato adjustment for those notes. So, if you want to adjust a performance's vibrato while making no other pitch changes, you can simply set all scale notes to Bypass and still use the Natural Vibrato function to adjust vibrato depth.

> **NOTE:** *This function acts only on vibrato present in the original performance. If the original performance does not contain vibrato, this control will have no audible effect.*

> **ANOTHER NOTE:** *Natural Vibrato adjustments function independently of the Create Vibrato functions described below. However, since both functions can operate simultaneously, they can interact in ways that may or may not be useful, depending on your intent. In most cases, you should probably use one or the other.*

The default Natural Vibrato setting is 0. Double-clicking or Command (Mac)/Control (PC) clicking the Natural Vibrato knob will reset it to that value.



Targeting Ignores Vibrato

Target note identification is the process by which Auto-Tune decides which note is the note the performer intended to sing or play, so that it may re-tune any pitch errors closer to that note. Normally, the target note is the nearest active scale note to the current input pitch.

The Targeting Ignores Vibrato feature is designed to help with target note identification when the performance includes vibrato so wide that it approaches adjacent scale notes. The most common symptom of this problem is a pronounced "warbling" as the input is alternately tuned to each of the upper and lower adjacent notes.

When this function is "On," Auto-Tune Live uses the impressively named Stochastic Optimal Linear Estimation Theory to attempt to recognize vibrato and differentiate between it and intended note changes. Our testing has shown that it works a lot of the time — but not always (it depends a great deal on the actual performance). When it works, Auto-Tune Live ignores the wide vibrato as far as target note selection is concerned. When

it doesn't, it works pretty much the same way it would work if the function were "Off."

The default state of this control is Off. When you've got a vibrato problem, try turning it on and see if it helps.

The Edit Scale Display

The Edit Scale Display is used to create custom scales or to modify any of the preset scales selected in the Scale popup. Edits made using this display are associated with each scale. That is, each scale retains its own edits independent of the other scales. For example, if you select C Major in the Key and Scale popups and Remove or Bypass certain notes and then change to C Minor and make other edits, when you return to C Major your previous edits associated with C MaThe Edit Scale window displays each note of the currently selected scale in the currently selected key. If the selected scale includes more than twelve notes, Up and Down arrows will appear to allow scrolling through all of the available notes.

Beside each note name are two buttons: a Bypass button and a Remove button. Click on a button to toggle its state. The button will light to indicate that its mode is active.

If neither of these buttons are lit, Auto-Tune Live treats this note as a normal scale note, i.e., when the input pitch is close to this note, Auto-Tune Live will correct the pitch to this note at the rate set by the Retune Speed control.

If the scale selected in the Scale popup contains exactly 12 notes (e.g., Chromatic, Pythagorean, Meantone Chromatic, Just, etc.), the Virtual Keyboard (see below) will be active and any edits to the scale notes made in the Edit Scale Display will also be reflected on the Virtual Keyboard.

> **NOTE:** *Although Auto-Tune Live allows setting scale note behaviors in individual octaves, any edits made via the Edit Scale Display will affect all octaves. To edit notes in individual octaves, use the Virtual Keyboard.*

Bypass

If the Bypass button is lit, when the input pitch is close to this note the input will be passed through with no correction.

Why set Scale notes to "Bypass?"

There are two main reasons to set one or more scale notes to "Bypass."

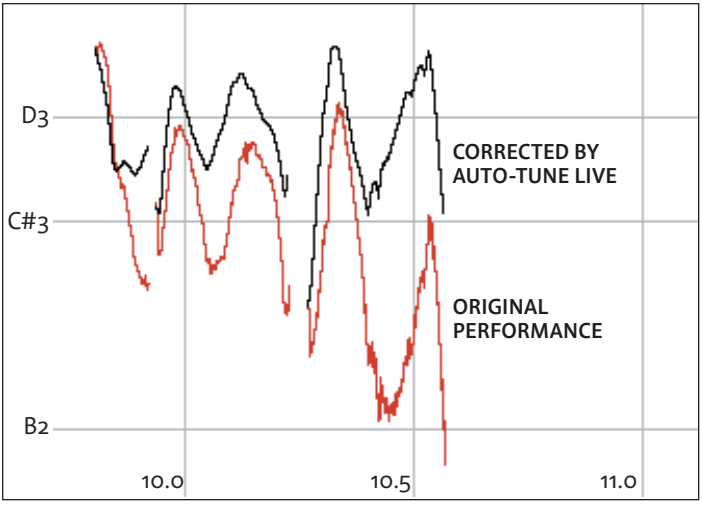
1. If a performance includes pitch gestures around one or more specific notes that you want to preserve with no modification whatsoever, you can set just those notes to Bypass. This lets Auto-Tune Live correct any pitch problems elsewhere in the scale but passes everything near the bypassed notes completely unprocessed.
2. If a performance contains only a single error, you can set all notes to Bypass except the one "sour" note. Auto-Tune Live will then pass the entire performance through unprocessed except for the sour note, which will be corrected.

Remove

If the Remove button is lit, then the note is simply removed from the current scale. For example, selecting the Chromatic scale and then setting C#, D#, F#, G#, A# to Remove would cause a C Major scale to remain. In that case Auto-Tune Live would always retune the input to the closest note of the C Major scale.

Why set Scale notes to "Remove?"

To understand why it is sometimes necessary to set even correct scale notes to "Remove," let's look again at the example from Chapter 2.



This phrase is in D Major and, if all the pitch errors were no greater than about 49 cents, would work fine with a standard D Major scale (D, E, F#, G, A, B, C#). However, the pitch error of three semitones at the end of the last note is so large that with B and C# present in the Scale, as the pitch fell, Auto-Tune Live would see first C# and then B as the target pitch and therefore allow the error to remain. With C# and B removed from the Scale, Auto-Tune Live continues to see D as the target pitch for the entire duration of the note and therefore pulls the phrase up to the correct pitch.

Cents

The number in the Cents column is the associated note's interval, in cents, from the root note of the scale. It's provided for reference purposes and to help you choose which notes of a micro-tonal scale to include or remove.

Set Major/Set Minor

When any scale that includes more than seven notes (i.e., any non-diatonic scale) is selected, the Set Major and Set Minor buttons will appear. Clicking on either of these buttons will "Remove" all notes from the scale except for those notes closest to the notes of a traditional diatonic major or minor scale (depending, of course, on which button you clicked).

Set All
Clicking this button sets all notes in the current scale to Scale Notes in all octaves. This function is useful as a Reset button to instantly erase all previous Remove and/or Bypass settings and reset an edited scale to its default state.

Remove All
Clicking this button sets all notes in the current scale to Remove in all octaves.

Bypass All
Clicking this button sets all notes in the current scale to Bypass in all octaves.

The Virtual Keyboard

The Virtual Keyboard displays Auto-Tune Live's pitch detection range and acts as a real-time display of the currently detected pitch, a display of the current Scale settings, and as a tool for setting target note behaviors in specific octaves.

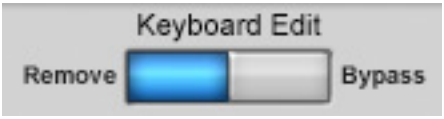
IMPORTANT NOTE: *The keyboard is only active for scales with exactly twelve notes. It will be grayed out (hence inactive) when any other scale is selected.*

"But wait!" you might be thinking, "I want to edit Major and Minor scales in individual octaves and the keyboard is grayed out when I select either one." No problem. Simply select Chromatic, then use the Set Major or Set Minor button to set up the scale of your choice and edit away.

ANOTHER NOTE: *When either the Major or Minor scale is selected, the virtual keyboard will display the the currently detected pitch (although the keyboard will still not be active for editing).*

Key colors
The color of the keys of the Virtual Keyboard indicate their current state as follows:

COLOR	STATE
Blue	The currently detected input pitch
White or Black	Scale Note
Gray	Removed Note
Light Brown	Bypassed Note

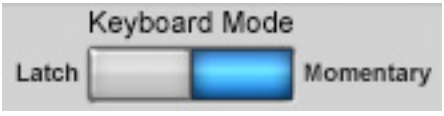


Keyboard Edit
These buttons are used to select which state (Remove or Bypass) will be toggled when you click on a key.

When Remove is selected, clicking on any key that is not currently set to Remove will set that key to Remove. Clicking on any key that is currently set to Remove will set that key to a Scale Note.

When Bypass is selected, clicking on any key that is not currently set to Bypass will set that key to Bypass. Clicking on any key that is currently set to Bypass will set that key to a Scale Note.

NOTE: *In the descriptions above, "clicking" on a key refers to pressing the mouse button down and then releasing it. The edit action is executed when the mouse button is released. Therefore, if the Keyboard Mode is set to Latch (see below), dragging across the keyboard highlights each key in turn, but it is only when you release the mouse button that the resulting key will change state.*



Keyboard Mode
When the Latch mode is active (i.e., the Latch button is blue), any edits made to the keyboard will latch — i.e., clicking a key will change its state and the key will retain that state until some other action causes it to change.

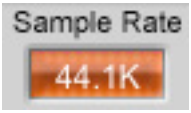
When the Momentary mode is active (i.e., the Momentary button is blue), keyboard edits are only active for as long as the mouse is held down on a key.

NOTE: *Pressing and holding the Shift key on your keyboard will temporarily toggle the Keyboard Mode.*

A TIP: *The main purpose of the Momentary mode is to allow you to deal easily with specific individual events in a performance. However, you can also use it to "play" the target melody notes in real time. To do this:*

- *Set the Scale to Chromatic and use the Scale Edit window Remove All button to remove all notes from the scale*
- *Set Keyboard Edit to Remove and Keyboard Mode to Momentary*
- *Now use your mouse to play the target melody on the keyboard.*

It's not nearly as easy as Target Notes via MIDI, but if you don't have a MIDI controller handy, it'll do in a pinch.



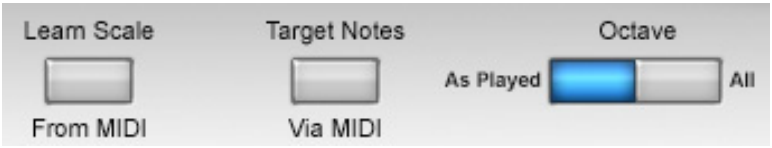
Sample Rate Display

This display indicates the sample rate of the current audio file as reported to Auto-Tune Live by the host application.

NOTE: *Auto-Tune Live is high sample rate compatible. If your host application and audio hardware are capable of dealing with up to 192 kHz files, Auto-Tune Live will process them correctly. However, it's important to remember that high sample rate files require substantially more DSP power than 44.1 kHz and 48 kHz files, so the number of possible simultaneous Auto-Tune Live instantiations will be decreased.*

YET ANOTHER NOTE: *If you are using external A/D converters with independently selectable sample rates, it can be possible to establish a mismatch between the actual conversion sample rate and what the host application thinks is the sample rate. If this happens, Auto-Tune Live will appear to be correcting pitch to the "wrong" key. If this appears to be happening, check to be sure that your converter sample rate and your host application sample rate (as displayed by Auto-Tune Live) match.*

Auto-Tune Live MIDI Functions



In addition to the MIDI control functions previously described in the Options section above, Auto-Tune Live provides two additional functions that require it to receive MIDI data from the host application. Depending on your intent, this data could come in real time from a MIDI controller (typically a keyboard) or from a prerecorded MIDI sequencer track. Refer to your host application's manual for details on how to route MIDI to Auto-Tune Live.

NOTE: *As previously mentioned, if you are using one of the few hosts that don't support routing MIDI to plug-ins, these MIDI functions will not be selectable.*

Instance ID

Some host applications assign numerical instance IDs to multiple instances of the same plug-in. If your host does this, the ID will appear in a small orange display below the Scale Edit Display. Instance IDs are useful when you are using any of Auto-Tune Live's MIDI functions, as they allow you to be sure that you are routing the MIDI stream to the correct instance of Auto-Tune Live on the desired track.

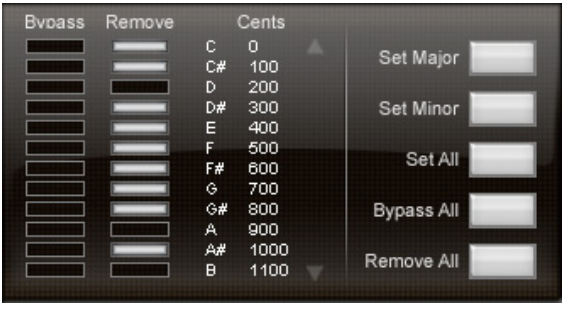
Learn Scale From MIDI

In most cases, you will probably tell Auto-Tune Live which notes are valid scale notes using the Key and Scale popups, the Edit Scale Display, and/or the Virtual Keyboard. However, there may be occasions when it is not clear exactly what key a melody line is in, or where the melody line has too many accidentals to fit comfortably into a conventional scale. For those occasions, the Learn Scale From MIDI function allows you simply to play the melody into Auto-Tune Live from a MIDI keyboard or sequencer track and let Auto-Tune Live construct a custom scale containing only those notes that appear in the melody.

To use the Learn Scale From MIDI function, ensure that the desired MIDI source is routed to Auto-Tune Live and then click the Learn Scale From MIDI button. Its color will change to blue and the Edit Scale display will automatically be set to a chromatic scale with all of the notes set to Remove.

Now play the melody to be corrected from your keyboard or sequencer. Tempo and rhythm don't matter, so take your time and make sure you don't play any wrong notes.

As each note is played, the corresponding Remove button in the Edit Scale Display is turned off (adding that note to the scale as a Scale Note). Assume, for example, that your melody starts with D, B, and then A. After playing those notes the display would look like this:



When you have played the entire melody, press the Learn Scale From MIDI button again to end the process. The Edit Scale Display will now contain a scale containing only those notes that appeared in your melody.

If you happen to have made an error during note entry, or want to try again for any other reason, simply click the Learn Scale From MIDI button and start the process again.

> **NOTE:** *When you start the process by pressing the Learn Scale From MIDI button, all notes are first Removed from the chromatic scale in preparation for adding just the notes you play. If you then press the Learn Scale From MIDI button again without playing any notes, you will be left with a chromatic scale with all notes removed. In that state, Auto-Tune Live will pass all notes with no correction applied. So don't do that.*

Target Notes Via MIDI

To use the Target Notes Via MIDI function, ensure that the desired MIDI source is routed to Auto-Tune Live, then click the Target Notes Via MIDI button. Its color will change to blue and the Edit Scale display will automatically be set to a chromatic scale with all of the notes set to Remove. While in this mode, Auto-Tune Live continuously monitors its MIDI input for Note On messages. At any instant, the scale used for correction is defined by all MIDI notes that are on. For example, if MIDI notes A, C and E are held, Auto-Tune Live's input will be retuned to an A, C or E, whichever is closest to the input pitch.

The source of the MIDI input would typically be a MIDI keyboard or sequencer track, and could consist of chords, scales, or, most powerfully, the exact melody that the input should be corrected to.

> **IMPORTANT NOTE:** *If you will not be defining Auto-Tune Live's target pitches via MIDI, be sure that the Target Notes Via MIDI button is off. If it is left on and no MIDI note data is present, Auto-Tune Live will pass through all audio unprocessed — giving the impression that Auto-Tune Live is not functioning.*

> **ANOTHER NOTE:** *We realize that there is some possibility of confusion between the Target Notes Via MIDI function and the Learn Scale From MIDI function described above. To clarify: Learn Scale From MIDI is used in advance of correction to create a custom scale. Target Notes Via MIDI is used to specify target pitches in real time while pitch correction is occurring.*

Octave As Played/All Octaves

For both of the MIDI functions (Learn Scale from MIDI and Target Notes via MIDI), you can choose whether you want incoming MIDI notes to affect all octaves or just the notes in the specific octaves in which they are played.

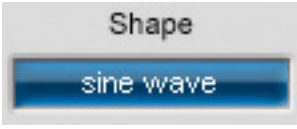
Simply click the desired button. The button will change color to blue to indicate your choice.

Create Vibrato Functions

The controls in this section are designed to add a synthesized vibrato to the input.

While vibrato is typically perceived to be a variation solely in pitch, careful analysis shows that, depending on the voice or instrument and the style of the individual performer, variations in amplitude (loudness) and formant resonances are also involved. Reflecting this, Auto-Tune Live includes a plethora of vibrato functions to allow the creation of much more convincing vibratos. (And for the adventuresome, they can be abused to create some "interesting" effects.)

The controls are:



Shape

Selects the shape of the vibrato.

The choices are:

No Vibrato Pretty self-explanatory.

Sine Wave Changes smoothly from minimum to maximum and back again. The most common choice for a conventional vibrato.

Square Jumps to maximum where it spends 50% of the cycle and then jumps to minimum for the remaining 50% of the cycle.

Sawtooth Gradually rises from minimum to maximum and then drops instantaneously to minimum to start the cycle again.

Rate
Sets the rate of the vibrato over a range of 0.1 Hz to 10 Hz. The default Rate setting is 5.5 Hz. Double-clicking or Command (Mac)/Control (PC) clicking the Rate knob will reset it to that value.

Variation
Sets the amount of random variation that will be applied to the Rate and Amount parameters on a note to note basis. Useful for humanizing the vibrato by adding random "errors."

The range is from 0 (no variation) to 100 (maximum variation). The default Variation setting is 20. Double-clicking or Command (Mac)/Control (PC) clicking the Variation knob will reset it to that value.

Onset Delay
Sets the amount of time (in msec) between the beginning of a note and the beginning of the onset of vibrato. The range is from 0 to 1500ms (1.5 seconds). The default value is 500ms. Double-clicking or Command (Mac)/ Control (PC) clicking the Onset Delay knob will reset it to that value.

Onset Rate
Sets the amount of time (in msec) between the end of the Onset Delay (set above) and the point at which the vibrato reaches the full Amounts set in the Pitch, Amplitude and Formant Amount settings. The range is from 0 to 1500ms (1.5 seconds). The default value is 500ms. Double-clicking or Command (Mac)/ Control (PC) clicking the knob will reset it to that value.

ONSET EXAMPLE: *As an example of the above parameters, assume an Onset Delay of 1000ms and an Onset Rate of 750ms. In that case, each time a new note starts there will be no vibrato at all for the first second (1000ms) followed by a 3/4 second (750ms) period during which the vibrato depths will increase from none to the full amounts set in the various Amount parameters — for a total of 1.75 seconds from the beginning of the note to the time full vibrato depth is reached.*

Pitch Amount

Sets the amount that the pitch changes. The range is from 0 (no change) to 100 (maximum change). The default setting is 18. Command (Mac)/Control (PC) clicking the slider will reset it to that value.

Amplitude Amount

Sets the amount that the loudness changes. For the most realistic vibrato, the amount of amplitude change should be substantially less than pitch change, although for special effects, anything goes.

The range is from 0 (no change) to 30 (maximum change). The default setting is 10. Command (Mac)/Control (PC) clicking the slider will reset it to that value.

Formant Amount

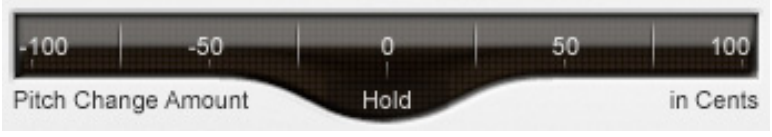
Sets the amount that the resonant timbre changes. The range is from 0 (no change) to 100 (maximum change). The default setting is 70. Command (Mac)/Control (PC) clicking the slider will reset it to that value.

NOTE: *The vibrato is re-started every time Auto-Tune Live matches the incoming pitch to a different scale tone. Also, the vibrato is applied after the effects of the Retune Speed control. Hence, even with a slow retune value of 50, a square wave vibrato will make instantaneous changes in pitch.*

ANOTHER NOTE: *As mentioned above, although we perceive vibrato primarily as a variation in pitch, in most cases there is also matching (though more subtle) variations in amplitude and timbre. Setting Auto-Tune Live's Retune Speed to 0 will remove an existing vibrato's pitch variation, but the amplitude and timbral variation will remain. If you then apply a new vibrato using Auto-Tune Live's Create Vibrato section, the results may be less than convincing. Auto-Tune Live's Vibrato section is more often useful for adding a vibrato to an input that originally had none, or for various special effects.*

YET ANOTHER NOTE: *The Create Vibrato controls function completely independently of the Natural Vibrato function. Changes in that function have no direct effect on the depth of any vibrato resulting from the Create Vibrato controls. However, since both functions can operate simultaneously, they can interact in ways that may or may not be useful, depending on your intent. In most cases, you should probably use one or the other.*

The Pitch Change Meter



The Pitch Change Amount Indicator

The Pitch Change Indicator shows you how much the pitch is being changed, measured in cents (100 cents = one semitone). For example, if the indicator bar has moved to the left to -50, it indicates that the input pitch is 50 cents too sharp and Auto-Tune Live is lowering the pitch by 50 cents to bring the input back to the desired pitch.

Hold Button

Clicking and holding the word "Hold" while Auto-Tune Live is processing audio will freeze both the Pitch Change Amount Indicator and the blue Detected Pitch indication on the virtual keyboard for as long as you hold down the mouse button. This is useful for figuring out exactly what's going on with a particular note in a performance that would otherwise pass too quickly to see.

Chapter 4: Auto-Tune Live Tutorials

This chapter introduces you to how Auto-Tune Live works by guiding you through a number of brief tutorials.

These tutorials make use of a number of audio files. (We will assume that you are familiar with loading audio files into your host application.)

If you purchased a packaged version of Auto-Tune Live, your will find the required files in the "Tutorial Audio" folder on the installation DVD ROM.

If you purchased your copy of Auto-Tune Live via download, you will have to separately download the Tutorial Audio files from the same web page from which you downloaded Auto-Tune Live.

Tutorial 1: Pitch Correction Basics

This tutorial will guide you through the basic Auto-Tune pitch correction functions using the file "A2-A3-A2 sweep." This is a simple synthesized waveform sweeping slowly from A2 up to A3 and back to A2. While it is unlikely that you'd ever need to process such an input with Auto-Tune Live, it provides a very clear example of what each of the main Auto-Tune Live controls do.

Begin the tutorial by doing the following:

1. Load or import "A2-A3-A2 sweep" into a track of your host program. Play the track so that you are familiar with the original audio.
2. Set up Auto-Tune Live to be an insert effect on that track.
3. Set the Key to "A" and the Scale to "Major."
4. Set the Retune Speed to zero.
5. Set "A2-A3-A2 sweep" to loop continuously and put your host program into Play mode.

What you will hear is an A major scale. This is because Auto-Tune Live is continuously comparing the input pitch to the notes of the A major scale and instantaneously correcting the output pitch to the nearest of the scale tones.

Now do the following:

1. In the Edit Scale Display, click the Remove buttons next to the notes B, D, F# and G#.
2. Play "A2-A3-A2 sweep" again.

You will now hear an arpeggiated A Major triad because you have removed all the other notes from the scale.

To continue:

1. In the Edit Scale Display, click the Bypass button next to E.
2. Play "A2-A3-A2 sweep" again.

You will now hear the effect of not correcting the E. During the time that Auto-Tune Live would normally be tuning the input to E, Auto-Tune Live instead enters bypass mode and passes the input through uncorrected.

To continue:

1. Set the Retune Speed to about 30.
2. Play "A2-A3-A2 sweep" again. Compare the 30 setting to the 0 setting.
3. Try various other Speed settings.

   The setting of 0 is fast: Auto-Tune Live makes instantaneous pitch changes. The setting of 30 is slower. Auto-Tune Live makes gradual pitch changes. This parameter controls how rapidly the pitch correction is applied to the incoming pitch. The units are milliseconds. A value of zero will cause instantaneous changes from one tone to another and will completely suppress a vibrato (note that related volume changes will remain). Retune values from 10 to 50 are typical for vocals.

To continue:

1. Set the Retune Speed to 0
2. In the Edit Scale Display, click the Remove buttons next to all the notes except F#.
3. Play "A2-A3-A2 sweep" again. As the sound is playing, move Scale Detune knob.

The output pitch will be locked to F#, however, you will hear the output pitch change with the Detune slider movement. This is because the Detune knob is changing the pitch standard of the scale.

Finally:

1. Select "sine wave" from the Vibrato Type pop-up.
2. Play "A2-A3-A2 sweep" again.
3. Experiment with the various vibrato controls to hear their effects.

Tutorial 2:
Targeting Ignores Vibrato Function

This tutorial will demonstrate the purpose and use of Auto-Tune Live's Targeting Ignores Vibrato function.

Begin the tutorial by doing the following:

1. Load or import "wide_vibrato" into a track of your host program. This is a recording of a male voice singing a sustained "G" with a pronounced vibrato. Play the track so that you are familiar with the original audio. Despite the wide vibrato, you will notice that the singer's pitch drifts alternately sharp and flat.
2. Set up Auto-Tune Live to be an insert effect on that track.
3. Set the Key to "C" and the Scale to "Chromatic."
4. Set the Input Type to Low Male Voice
5. Set Retune Speed to a value of 24.
6. Use your host program's controls to Bypass Auto-Tune Live. Set "wide_vibrato" to loop continuously and put your host program into Play mode. Watch the blue Detected Pitch indication on Auto-Tune Live's Virtual Keyboard. As you will see, the singer's vibrato is so wide that it consistently gets closer to G# and F# than G, causing Auto-Tune to intermittently select those notes as target pitches.
7. Check that Targeting Ignores Vibrato is not selected and remove Auto-Tune Live from Bypass. Watch the Detected Pitch indication and listen to the result. As you will hear, whenever Auto-Tune Live thinks G# or F# is the target pitch, it will move the input closer to those notes, in effect making the situation worse.
8. Now, leaving all other settings the same, click Targeting Ignores Vibrato. With Targeting Ignores Vibrato engaged, Auto-Tune Live's vibrato identification algorithm recognizes the pitch excursions as vibrato and continues to use "G" as the target pitch.

Tutorial 3:
Natural Vibrato Function

This tutorial will demonstrate the use of the Natural Vibrato function using the same audio file we used in the previous tutorial.

Begin the tutorial by doing the following:

1. Load or import "wide_vibrato" into a track of your host program. This is a recording of a male voice singing a sustained "G" with a pronounced vibrato. Play the track so that you are familiar with the original audio.
2. Set up Auto-Tune Live to be an insert effect on that track.
3. Set the Key to "C" and the Scale to "Chromatic."
4. Set the Input Type to Low Male Voice
5. Set Retune Speed to a value of 24.
6. Set "wide_vibrato" to loop continuously and put your host program into Play mode.
7. Set Natural Vibrato to 12 and note the effect on the vibrato. Set Natural Vibrato to -12 and note the effect on the vibrato.
8. Set all Scale notes to Bypass to disable any pitch correction. Again, adjust Natural Vibrato as in Step 7 and note that its effect is still active.

Chapter 5: The Auto-Tune Vocal Effect

In addition to its adoption as the worldwide standard in professional pitch correction, Auto-Tune has also gained renown as the tool of choice for what has become one of the signature vocal sounds of our time.

Since there seems to be a lot of mythology about how it's accomplished, we thought we'd provide the official Antares version here.

What is it?

Quite simply, the Auto-Tune Vocal Effect is what is technically known as "pitch quantization." That is, instead of allowing all of the small variations in pitch and the gradual transitions between notes that are a normal part of singing (and speaking, for that matter), the Auto-Tune Vocal Effect limits each note to its exact target pitch, stripping out any variation, as well as forcing instantaneous transitions between notes.

How to do it.

There are basically two key elements to producing the Auto-Tune Vocal Effect:

1. Retune Speed = 0
2. Pick the right scale

That's pretty much it. Really.

There are, however, some possible variations in approach. Here are the details:

1. As we already mentioned, start by setting Retune Speed to 0.
2. Set the Key and Scale to the key and scale of your track.
3. Play your track. If you like the result, you're done.
4. If you're not happy with the result, try one or more of the following:
   - Edit the scale notes. Depending on the specific vocal line, adding or removing scale notes can give you distinctly different effects.
   - Try a different key and/or scale.
   - Try the chromatic scale (although our experience is that if you're going for the classic effect, chromatic rarely provides it).
   - Try a Retune Speed of 1 or 2 or a bit slower. This will allow slight pitch variations and slightly less instant note transitions, but may result in the right effect for a particular performance.

5. Don’t forget your host’s Bypass function. Limiting the Auto-Tune Vocal Effect just to specific phrases can provide sonic contrast in your song.

Chapter 6: The Auto-Tune Live Scales

The following are brief descriptions of the scales available in Auto-Tune Live:

MODERN EQUAL TEMPERAMENT

These first three equal-tempered scales are the ubiquitous scales typically found in Western tonal music:

Major: A seven-tone equal tempered major scale.

Minor: A seven-tone equal tempered minor scale.

Equal Tempered chromatic: A twelve-tone equal tempered chromatic scale.

HISTORICAL TUNINGS

Ling Lun: A twelve-tone scale dating from 2Live00 B.C. China.

Scholar's Lute: A seven-tone scale dating from 300 B.C. China.

Greek diatonic genus: A seven-tone scale from ancient Greece.

Greek chromatic genus: A seven-tone scale from ancient Greece.

Greek enharmonic genus: A seven-tone scale from ancient Greece.

Pythagorean: A twelve-tone scale dating from 600 B.C. Greece. This scale is derived by tuning twelve pure perfect fifths upward and adjusting the octaves downward. This leads to some pure intervals and some very impure intervals.

Just (major chromatic): A twelve-tone scale. Just intonation tunes the most frequently used intervals to be pure (integer ratios in frequency). These tunings depend on the mode (major or minor) and the key. This scale is tuned for major mode.

Just (minor chromatic): (See Just (major chromatic), above)

Meantone chromatic: A twelve-tone scale. This tuning is a combination of Pythagorean and just tunings so that music in a wider variety of keys could be playable.

Werckmeister III: A twelve-tone scale. This scale was a first attempt (about Bach's time) to allow an instrument to be played in any scale. It was in response to this scale that Bach wrote Well-Tempered Clavier.

Vallotti & Young chromatic: A twelve-tone scale. Another derivative of the Pythagorean scale designed to allow arbitrary keys.

Barnes-Bach (chromatic): A twelve-tone scale. A variation of the Vallotti & Young scale designed to optimize the performance of Bach's Well-Tempered Clavier.

ETHNIC TUNINGS

Indian: This 22-tone scale is used in India to perform ragas.

Slendro: This five-tone Indonesian scale is played by ensembles called gamelans.

Pelog: This seven-tone Indonesian scale is more interesting than Slendro and is now the primary scale in Balinese music.

Arabic 1: This 17-tone scale is the original Arabic scale adopted from the Pythagorean scale.

Arabic 2 (chromatic): This twelve-tone scale is the modern version of the Arabic scale popular in Arabic music today.

CONTEMPORARY TUNINGS

Equal tempered scales with a large number of tones are typically used to play common tonal harmony with greater purity of intervals and chords. The typical approach is to analyze a passage (or less) of music and select tones from a scale that will best approximate the desired pure intervals.

19 Tone: This scale has greater purity of minor thirds and major thirds (and conversely, minor and major sixths) than twelve-tone equal temperament. A disadvantage is that perfect fifths are narrower than those found in twelve-tone equal temperament.

24 Tone: Also know as the quarter tone scale, this scale is used for variety but has no advantage in terms of ratios that better approximate pure intervals.

31 Tone: In addition to intervals that better approximate pure intervals, this scale also contains good approximations to Indonesian pelog and slendro scales.

53 Tone: Related mathematically to the cycle of fifths, the 53-tone scale has very pure major and minor thirds, and fifths and fourths.

Partch: Harry Partch is considered the father of modern microtonality. This scale was devised by him and used in instrument building and performances.

Carlos Alpha: Wendy Carlos performed extensive computer analysis to devise a number of equal tempered scales with good approximations for the primary harmonic intervals and their inversions. This scale is good at approximating the primary intervals including Live/4. This scale divides the octave into 15.385 steps forming intervals of Live8.0 cents.

Carlos Beta: This scale divides the octave into 18.809 steps forming intervals of 63.8 cents.

Carlos Gamma: This scale achieves perfect purity of the primary intervals 3/2, 4/3 and 5/4. This scale divides the octave into 34.188 steps forming intervals of 35.1 cents.

Harmonic (chromatic): This twelve-tone scale is created in the partials in the fifth octave of the harmonic series. The scale degrees that correspond to the classic just intervals are the major second, major third, perfect fifth and major seventh.

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